**Debate takes flight over the color of winged dinosaur. By Philadelphia Inquirer, adapted by Newsela staff**

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Grade level: **8**

Archaeopteryx fossils from the Paleontology Museum in Munich, Germany. Photo: Wikimedia Commons

PHILADELPHIA — Call it “The Mystery of Oblong Blobs.”

In the existing scientific view, they are microscopic remains of ancient pigment granules, or bits of animal coloring. Scientists think the granules offer clues to the colors of winged dinosaurs.

But a new study by a Drexel University graduate proposes a different explanation — one that has ruffled a few academic feathers.

Alison E. Moyer, now a Ph.D. student at North Carolina State University, says the cigar-shaped “microbodies,” just one-millionth of a meter long, might simply be impressions left by very old bacteria. Their size and shape, among other attributes, do not rule out either interpretation, she says.

“You have these little structures that look very similar, and so we have to be careful,” said Moyer, lead author of the paper published this month in the journal Scientific Reports.

**Pigment Granules Or Bacteria?**

The study has prompted a heated social media reaction from one researcher who favors the interpretation that the shapes are melanosomes, or bits of color. Others in the field have been more accepting of Moyer’s work. They acknowledge it as a helpful challenge to established views.

Such give-and-take is found more frequently in paleontology than in some other fields of science, because the only sure way to answer certain questions about the ancient world would be to travel back in a time machine.

Failing that, Moyer found a living time machine: a chicken.

Paleontologists consider birds to be modern dinosaurs, so Moyer took chicken feathers and grew bacteria on them. She compared the bacteria with the pigment granules inside the feathers, as well as with the oblong impressions found in fossilized feathers from winged dinosaurs.

The size, shape, and distribution of the fossil impressions suggested bacteria, though it is still possible that they were pigment granules, she said.

Her work was overseen by prominent N.C. State paleontologist Mary H. Schweitzer, while her co-authors included Ken Lacovara, associate professor of paleontology and geology at Drexel.

**Feathers Fly**

Matthew D. Shawkey, an associate professor in the integrated bioscience program at the University of Akron, said on Twitter that the new research was “bad science.”

Shawkey, who was involved in a 2012 study that determined the feathers of the winged dinosaur Archaeopteryx were black, had several objections to Moyer’s paper.

Chief among them was the placing together of two images. One showed cigar-shaped bacteria on a chicken feather, the other depicted similar-shaped impressions found in a fossil feather from Archaeopteryx.

At a glance, the dark shapes in the two images look about the same size. Shawkey’s beef is that the images are reproduced at different scales, as indicated in the fine print, and that the bacteria on the chicken feathers are actually four times as long as the impressions in the fossils.

“That’s not a good way to give confidence in your paper,” Shawkey said.

Moyer counters that the bacteria are closer to twice the length of the fossil impressions. To the untrained eye, the graininess of the image makes it a bit hard to tell who is right.

In any event, the size of the purported melanosomes falls well within the range of the sizes of known bacteria, Moyer said.

**Studying Shapes**

Another reason that the matter remains up in the air: Chemical analysis of the fossil feathers has been inconclusive, she said.

Another scientist who has interpreted the shapes as pigment granules had a more receptive attitude to the work of Moyer and her colleagues than Shawkey did.

“It’s always good to take one step back,” said Johan Lindgren, an associate professor at Lund University in Sweden. “What they’re saying is we need more data, and I think that’s fair.”

So how did the other scientists conclude anything about the color of dinosaur feathers, if all that remained of the purported pigment granules was their fossilized imprints?

The key was their shape. By looking at what granule shapes were associated with which colors in modern birds, the scientists concluded that various winged dinosaurs were black, gray or brown.

Or maybe not. Said Moyer, “There’s a ton of work that needs to be done.”

Content Based Responses:

1. Why are the “oblong blobs” on certain dinosaur fossils a controversial topic for paleontologists?
2. Present two possible hypotheses for the oblong blobs. Explain why the viewpoints presented are conflicting.
3. The test discussed in the article to determine the origin of the blobs was called “bad science”. Defend or argue against this viewpoint using evidence from the text.
4. How do scientists currently make their assumptions regarding the color of dinosaurs?